



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: **WATER RESCUE PLANS,
FACILITIES, AND EQUIPMENT**

Date: **5/31/91**
Initiated by: **AAS-100**

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Change:

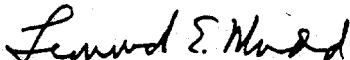
1. PURPOSE. This Advisory Circular (AC) provides guidance to assist airport operators in preparing for water rescue operations.

2. CANCELLATION. AC **150/5210-13**, Water Rescue Plans, Facilities, and Equipment, dated May 4, 1972, is canceled.

3. APPLICABILITY. The material contained in this AC is applicable for use in the operation of civil airports where aeronautical activity is conducted near a significant body of water. Certificated airports may use these recommendations and guidelines to satisfy certain portions of the requirements of Federal Aviation Regulations (FAR) Part 139, Section 139.325.

4. RELATED READING MATERIAL. AC **150/5200-31**, Airport Emergency Plan, dated January 27, 1989, and AC **150/5210-7B**, Aircraft Fire and Rescue Communications, dated April 30, 1984.

5. METRIC UNITS. To promote an orderly transition to metric (SI) units, this AC contains both English and metric dimensions. The metric conversions may not be exact and, pending official changeover to this system, the English system governs.


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Director, Office of Airport
Safety and Standards

1. **INTRODUCTION.** The following paragraphs provide guidance on the special considerations relating to preparing for water rescue operations in the vicinity of an airport. These include the preplanning actions, such as delineation of responsibilities, the planning process, training, and equipment.

2. **BACKGROUND.**

a. **Information Source.** The National Transportation Safety Board recorded 82 aircraft accidents in water during the period from January of 1978 to March of 1989. The lessons learned in those water rescue operations have been incorporated in this AC.

(1) **Domestic Operations.** While aircraft involved in domestic operations carry "flotation devices," they do not typically carry rafts or life vests.

(2) **Overseas Operations.** In contrast, aircraft engaged in overseas operations carry life vests, large rafts, and/or other flotation devices capable of getting a large number of passengers out of the water.

However, this equipment is most useful in a ditching where there is time to preplan/brief the passengers on the intended **course** of action upon landing in the water.

b. **Water Rescue Preparedness.** Airport officials **responsible** for emergency preparedness should develop an airport emergency plan (as detailed in AC 150/5200-31) and **should** provide water rescue services as dictated by the airport's proximity to significant bodies of water.

3. **SPECIAL, CONSIDERATIONS.**

a. **Major Survival Factors.** Survivors may be subjected to postimpact fires, fuel/vapor ingestion, hypothermia, further injury from debris, drowning, freezing, and/or attack by marine life.

b. **Water Temperature.** Survivors in the water are much more dependent upon rescue teams than in similar incidents on dry land. The critical nature of rescuing survivors from the water is particularly evident when the chart of estimated survival times is considered. (See below) The estimated times for the

WATER TEMPERATURE AND ESTIMATED SURVIVAL TIME	
WATER 38 DEGREES FAHRENHEIT	
Loss of use of hands and forearms.....	15 minutes
Loss of mental activity.....	45 minutes
Hypothermia & death.....	65 minutes
WATER 48 DEGREES FAHRENHEIT	
Loss of use of hands and forearms	20 minutes
Loss of mental activity.....	60 minutes
Hypothermia & death.....	90 minutes
WATER 70 DEGREES FAHRENHEIT	
Loss of use of hands and forearms	3 hours
Loss of mental activity.....	4-5 hours
Hypothermia & death.....	6 hours

onset of physical and mental problems resulting in hypothermia **and** death are based **upon** cooling rates for young (19-29 yrs. old) adults **who had undergone** medical screening and stress tests. Hence, the survival data should be viewed as a **"best case"** situation. The figures were provided by the **U.S.** Coast Guard, Office of Operational Medicine.

c. **Duration of Exposure.** An additional factor to be considered is the proper **warming** of survivors after being rescued. The rescue craft should hold the proper amount of blankets and other warming equipment to prevent survivors from experiencing hypothermia or even death while in transit to medical facilities.

d. **Evacuation.** Identification of means for dealing with problems associated with getting survivors from the water into rafts, boats, helicopters, etc., and onto dry land is an important aspect of water rescue planning.

4. WATER RESCUE RESPONSIBILITIES.

a. **Certificated Airports.** In accordance with FAR Part 139, certificated airports are required to include in their airport emergency plan, to the extent practicable, provisions for the rescue of aircraft accident victims from significant bodies of water or marsh lands which are situated adjacent to the airports and lie beneath the approach and departure flight paths of air carriers.

(1) **Significant Body of Water.** A body of water or marsh land is significant if the area exceeds one-quarter square mile (0.6 sq km) and cannot be traversed by conventional land rescue vehicles. Significant bodies of water located within at least 2 miles (3.2 km) of the end of an airport runway should be included in the emergency plan area of response.

(2) **Responders Identified.** The airport's emergency plan should include the name, address, and telephone number of each water rescue squad, service, or **Federal/State/local** agency (i.e., U.S. Coast Guard, Coast Guard Auxiliary, or Harbor Patrol) responsible for conducting water rescue operations in the significant body of water.

b. **Primary Response Agency Other Than Airport.** If the significant body of water is located off airport property, it is very likely the airport will not be the primary response agency. In such cases, it is the responsibility of the airport to ensure that the

appropriate rescue agency/agencies are formally notified of the possibility of an aircraft accident in the significant **body of water.**

(1) **Mutual Aid.** A water rescue plan that consists of a mutual aid agreement identifying an entity other than the airport to act **as** the primary response agency may be the only jurisdictional or logistical choice for an airport. Such agreements are typically signed with the U.S. Coast Guard, Marine Police, Harbor Patrol, Coast Guard Auxiliary, or National Guard. A water rescue plan may also contain additional signed agreements with private entities such as tug operators, cruise lines, ferries, crane operators, diving companies, and marina facilities.

(2) **Responders Identified and Involved in Exercises.** For certificated airports where the **primary** response agency responsibilities and duties are being assumed by another entity, these responsibilities and duties should be set forth in a written Mutual Aid Agreement. In accordance with Part 139, the airport's emergency disaster plan must be thoroughly reviewed periodically, i.e., a **tabletop** or a full-scale exercise every year. The water rescue component should also be evaluated periodically as part of either the annual **tabletop** or the three-year full-scale exercise.

5. WATER RESCUE PLANNING.

a. **Response Assignments.** The airport emergency plan should set forth expected actions of all participating agencies and establish what agency will assume the primary response role. If the airport will not assume the primary response role, the airport's support role to the primary response agency should be clearly defined.

b. **Support Inventory.** The water rescue plan should state exactly what services, equipment, and capabilities are to be available from all agencies; **including** facility location and mobilization of personnel and equipment. This inventory **list should** be maintained and updated regularly to **ensure** that the necessary equipment and personnel are available. To the extent practicable, the plan should provide for use of rescue vehicles with a combined capacity for **handling** the maximum number of persons that can be carried on board the largest air carrier aircraft that the airport reasonably can be expected to serve. Several, of the emergency response requirements specified in FAR Part 139.325, Airport Emergency Plan, are applicable to accidents either on land or in water.

c. The **Three Cs**. Special emphasis should be placed on **command, control, and communications** at the accident site, and onshore.

d. **Additional or Unplanned Assistance.** The plan should recognize that assistance from the general public may be forthcoming when they see or learn of the accident. Because they are not likely to be familiar with aircraft or experienced in emergency response, they may inadvertently increase the danger to survivors in the water. It is very important to recognize this factor and to establish command, control, and communication procedures to address their involvement, if any, in the rescue.

e. **Disposition of Survivors.** The plan should set forth practices and procedures for rescue of survivors from floating and/or submerged sections of fuselage. The airport or primary response agency should establish specific docking/landing areas (both primary and alternate sites) onshore, where survivors can be brought for triage and transportation to hospital facilities. In selecting the docking/landing areas, it should be kept in mind that routes through the airport proper may not provide the most direct access to the hospital with facilities appropriate for treating survivors.

f. **Other Considerations.** In addition to the items outlined above, the plan should address items such as notification regarding the incident or accident, jurisdictional authority, alarms, response times, hazardous material, and/or other special considerations, personnel recall, security, traffic control, medical, rescue, **firefighting**, inventory of specialized services and equipment, training, drills, triage, services for uninjured, airline support, removal of deceased, and the resumption of normal operations. These items are also included in the overall airport emergency plan.

6. **TRAINING.** The use of untrained personnel in water rescue operations is an unacceptable practice. It could create an increased danger to the accident victims, as well as to the untrained rescuer. Improper knowledge and/or the lack of experience with handling a small boat can, especially in emergency situations, render useless an otherwise competent rescue person.

a. **Designated personnel.** At airports that plan to provide water rescue, the rescue staff is generally selected from among trained ARFF and/or airport police personnel. They too should be given additional training in small boat handling in the specific craft utilized at the airport. Training may be provided by the manufacturer of the craft or obtained from any

other competent source. To be **cost** effective, these **specially** trained personnel should be assigned to the water rescue team for as long a time **as** is practical.

b. **Topics for training.** The airport operator should ensure that their designated employees, mutual aid personnel, or any others expected to engage in water rescue activities, are trained **in the** following areas as appropriate:

(1) An appropriate level of seamanship and small boat handling skills. **The** U.S. Coast Guard at their Yorktown, Virginia Training Facility; the local Coast Guard **Auxiliary**; or the U.S. Power Squadron (a nonprofit association) are typical training resources.

(2) Search and rescue planning, techniques, and procedures.

(3) Marine rescue and scuba diving.

(4) Lifesaving.

c. **Initial and recurrent training.** It is important that a recurrent training schedule be established for personnel involved in water rescue soon after their initial training is completed. Personnel should train in the use of the boats and other equipment on a regular basis, including during inclement weather and under winter conditions.

7. **SOURCES FOR WATER RESCUE INFORMATION AND TRAINING.** A partial list of sources, both public and private, for information and training related to various aspects of water rescue is given below. This list **is** not represented to be complete nor does it indicate the only sources for such training. It is provided only as starting point information for emergency preparedness officials. It does not represent an endorsement by the FAA. The mail and telephone information was current on the date of publication of this advisory circular.

United States Coast Guard
Reserve Training Center
Yorktown, VA 23690-5000
804/898-3501

United States Power Squadron
1504 Blue Ridge Road, P.O. Box 30423
Raleigh, NC 27622
919/821-0281

Marine Rescue Consultants
1825 Westcliff Drive, Suite 105
Newport Beach, CA 92660
714/966-6455

Boat U.S. Center
Boating Safety Courses
880 South **Pickett** Street
Alexandria, VA 22304
1-800/336-2628

American Red Cross
Contact local office and ask for
Health & Safety Services Office
for a full listing of swimming,
water rescue, and boating courses.

**Professional Association of
Diving Instructors**
1251 East Dyer Road, #100
Santa Ana, CA 92705
1-800/729-7234

Safe Boating Institute
4-481 Head Street
Victoria, British Columbia
Canada V9A 5S1
604/383-3933

Air Force Rescue Coordination
Detachment 2 **ARS/AFRCC**
Scott Air Force Base, IL 62225
1-800/851-3051 or 618/256-4815

Kingsborough Community College
Center for Marine Development & Research
2001 Oriental Boulevard
Brooklyn, NY 11235
718/368-5525

8. **COMMUNICATIONS.** The planning and implementation of proper and effective communications for water rescue operations is complex. In an accident on an airport, it is the airport's responsibility to respond. However, in an aircraft accident in the water, it is often likely that another governmental agency will be providing the primary response. Therefore, it is important for the airport to quickly communicate to the primary response agency the fact that an accident has taken place, where it is, and to find out where the command post will be established.

a. **Notification of Airport Rescue Personnel.**
Airport rescue personnel in the **ARFF** station or

water rescue substation should be notified of an aircraft in the water. Cross-trained **personnel** located in the terminal building or elsewhere on the airport should be notified by walkie-talkie (radio) or other reliable means.

b. **Notification of Mutual Aid Partners.** A reliable voice and electronic communications system should be available between the airport and other official agencies or parties specified in the Mutual Aid Agreement. The system may be implemented by telephone, radio, etc.

(1) Marine VHF channel 16 is the frequency on which all emergency communications are initiated. The U.S. Coast Guard normally conducts **all** communication during an emergency rescue operation on VHF channel 22. Other Marine VHF channels may be used in emergency situations in different areas and jurisdictions. ,

(2) The establishment and location of a command post to direct rescue operations, as well as the method(s) of communication to be used, should be addressed in the emergency plan.

c. **Command and Control During the Rescue Operation.** It must be recognized that rescue operations performed by other agencies, particularly the U.S. Coast Guard or Harbor Police, may require the airport to establish communications on a marine radio frequency with the primary response agency. This may require the airport to purchase marine radios or install marine radio channels in airport radios. In addition, the designation of a command post may be the prerogative of the primary response agency, and the airport should ensure that it is able to communicate with the designated post.

d. **Coordination.** Rescue operations between personnel on the water and on land must be coordinated to ensure that survivors are brought to the previously designated areas on shore where ambulances and medical care are located.

9. **RESCUE VEHICLES AND EQUIPMENT.**

a. **Types of Vehicles.**

(1) Vehicles used in conducting water rescue operations must be appropriate to the particular water environment involved. Collectively, they should be capable of accommodating the maximum number of passengers carried by the **type** of aircraft **sewing** the airport. To ensure the selection

of water rescue vehicles appropriate for use at a specific airport, seasonal weather variations, e.g., ice, wave height, water temperature, hours of daylight, prevailing winds, etc., must be taken into consideration.

(2) Normally, various types of boats will be the primary water rescue vehicles. Other vehicles may include helicopters, air cushion vehicles, and shallow draft "air boats." Amphibious and track vehicles may have some utility in swamp rescue operations.

b. Use of Vehicles and Equipment.

(1) **Conventional Boats** • These vessels are useful for transporting rescue personnel and equipment, deploying flotation equipment, picking up survivors, firefighting, securing the scene, communications, etc. Some boats are designed and may be used in the same manner as rapid intervention vehicles in conventional ARFF responses.

(2) **Amphibious Fireboat** • An amphibious firefighting vehicle capable of 25 to 30 mph (40-48 kph) on land and 8 mph (13 kph) in water can be useful for rough terrain, steep slopes, flooded areas, as well as for permanent, significant bodies of water.

(3) **Rescue Boats/Ships** • These fiberglass or aluminum hulled boats may have inboard or outboard engines capable of speeds up to 60 mph (95 kph). Some of the boats are designed to allow for the removal of a section of the hull (freeboard) to provide easy access into and out of the water. The boats can vary in length from 17 to over 40 feet (5-12 m). Depending upon the size of the boat, enclosed or at least sheltered accommodations may be available to protect survivors from the environment. It is important that the boat have easy access around most of the topsides to allow rescue personnel to deploy raft canisters or to assist survivors in the water.

(4) **Flotation Platforms** • These vessels are simply large, inflatable rafts with netting draped over the side and all unnecessary equipment removed to provide a highly buoyant means of keeping 10 to 20 people afloat until rescue craft arrive. They should be provided with appropriate fittings so that they may be safely towed to shore if necessary.

(5) **Inflatable Boats** • Normally, these boats are a very shallow draft vessel. They may be a rigid or a true inflatable boat, with a diesel/gasoline-powered propeller and/or water jet propulsion, capable

of a 30 to 50 mph (48-80 kph) speed. The 2% to 28-foot (6.6-8.5 m) lengths should be the most useful for the rescue of an approximate load of 15 persons.

(6) **Shallow Draft "Air Boat"** • These vessels can be 7 to 8 feet wide (2.1-2.4 m), 13 to 20 feet long (3.8-6 m), and are propelled by aircraft or auto engines driving aircraft-like propellers. Larger models carry approximately 2,200 pounds (1,000 kg) of people and/or water rescue and medical equipment. They require only a single operator and can operate at speeds up to 50 mph (80 kph) in extremely shallow water, tidal flats, marshes, and snow-

(7) **Air cushion vehicles or "air boats"** • These can be used in the same manner as conventional boats and will usually have a higher response speed in calm waters. They are useful in very shallow water as well as on mud flats.

(8) **Helicopters** • These, and perhaps fixed wing aircraft in some cases, are most useful for transporting and deploying rescue personnel and equipment. They are faster than any surface vehicle and are particularly useful for shuttling additional personnel and equipment to the scene providing weather conditions are acceptable. Helicopters also have a high utility in communications and command post activities. However, they can be disorienting and frightening to survivors in the water due to rotor downwash and noise. Helicopter operations in narrow rivers may be constrained by obstructions, trees, bridges, power lines, etc. If helicopters are to be used in water rescue operations, the areas in which they can safely operate should be determined early in the planning process. Planners should not rely solely on helicopters for rescuing survivors.

(9) **Dragging and Underwater Rescue Equipment** • Wet/dry suits, masks and fins, buoyancy control devices, underwater dragging bars, hooks, and lines are needed for locating and retrieving objects underwater.

(10) **Other Equipment that should be available** • Area maps and navigation charts, bailing buckets, water pumps, blankets, bull horns, communications equipment, emergency lights, flares, forcible entry tools, grappling bars and hooks, liferafts (with oars or paddles), medical kits, navigational equipment, portable resuscitation equipment, portable 500-watt or greater floodlights, rescue nets, scuba gear, stretchers/litters, throwing equipment, and anchor should be available and readily accessible.

c. Specific Applications.

(1) **Oceans or Large Lakes.** Coastal airports or their primary response agencies' should consider boats to be their primary response vehicles. Helicopters that can be dispatched by the airport or secured from other agencies for the transportation of rescue personnel and/or flotation equipment are **also** of prime importance. Such airports should consider a fast boat capable of carrying the appropriate amount of flotation gear, plus having some firefighting capability, and **also** a larger boat capable of taking survivors on board, and providing other support such as medical, communications, etc.

(2) **Inland Waters.** Boats, inflatables, and/or air cushion vehicles may be the primary response vehicle at airports located adjacent to rivers and small lakes. Boats of appropriate size and capability should be available for immediate response. Such airports should consider a relatively small, fast boat(s) capable of carrying the appropriate amount of flotation gear, plus having some firefighting capability, and also a larger boat capable of taking survivors on board, and providing other support such as medical, communications, etc.

(3) **Wetlands.** Water rescue operations in swamps may **utilize shallow** draft boats, "air boats," air cushion vehicles, helicopters, various track vehicles, and "high flotation" and/or amphibious vehicles. The swamp should be traversed or examined by air prior to selecting the appropriate rescue equipment,

10. **EQUIPMENT SOURCES.** A partial list of sources for equipment related to water rescue operations is given below. This list is not represented to be complete nor does it indicate the only sources for such equipment. It is provided only as a starting point information for emergency preparedness officials. It does not represent an endorsement by the FAA. The **mail** and telephone information was current on the publication date.

Boston Whaler, Inc.
Commercial Products Division
1149 Hingham Street
Rockland, MA 02370
617/871-1400

British Hovercraft Corporation
Avondale Boat Division
4132 Peters Road
Harvey, LA 70009
504/366-7217

National Marine Manufacturers Association
Public Relations Department
401 North Michigan Avenue
Chicago, IL 60611
312/836-4747

Scat Hovercraft, Inc.
Commercial/Rescue Division
6865 NW 36th Avenue
Miami, FL 33147
305/691-5100

Task Force Boats LTD.
58 Jermyn Street
London **SW1Y 6LX**
England

TFB, USA Agent
JGW INTERNATIONAL LTD.
10640 Main Street, Suite 200-B
Fairfax, VA 22030, USA
703/385-6470

Zodiac of North America, Inc.
P.O. Box 400
Stevensville, MD 21666
301/643-4141

11. UNITED STATES COAST GUARD DISTRICT OFFICES.

District 1
408 Atlantic Ave.
Boston, MA 02210-2209
617/223-8480

District 2
1430 Olive Street
St. Louis, MO 63101-2378
314/425-4601

District 5
431 Crawford Street
Portsmouth, VA 23704-5004
804/398-6287

District 7
1018 Federal Building.
Miami, FL 33130-1608
305/536-5654

District 8
500 Camp Street
New Orleans, LA **70130-3396**
504/589-6298

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District 9
1240 E. 9th Street
Cleveland, OH 44199-2060
216/522-3910

District 11
400 Oceangate Blvd.
Long Beach, CA 90882-5399
213/499-5201

District 13
915 2nd Avenue
Seattle, WA 98174-1067
206/442-5078

District 14
300 Ala Moana Blvd.
Honolulu, HI 96850-4982
808/541-2051

District 17
P.O. Box 3-5000
Juneau, AK 99802-1217
907/586-2680

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